CLAIMS

1. A method of manufacturing an outer race member for a tripod-type constant-velocity joint having a shank and a cup which are integrally formed by cold forging, comprising the steps of:

extruding forwards a cylindrical workpiece (10) cut to a predetermined length to form a primary formed body (16) having a shank (14);

preliminarily upsetting an upper portion (18) of said workpiece (10) except said shank (14) thereof to form a secondary formed body (20);

further upsetting an upper portion (22) of said secondary formed body (20) except said shank (14) thereof to form an intermediate preliminary formed body (24) having an annular slanted surface (36) which provides a material-flow resistance difference between larger-diameter portions (28a through 28c) and smaller-diameter portions (30a through 30c) thereof;

extruding backwards said intermediate preliminary formed body (24) to form a quaternary formed body (58) having a cup (62) with track grooves (60a through 60c) defined therein; and

ironing said cup (62) of said quaternary formed body (58).

2. A method according to claim 1, wherein said

intermediate preliminary formed body (24) has a disk-shaped head (26) which is thinner and larger in diameter than said upper portion (22) of said secondary formed body (20), said head (26) having, as viewed in plan, a plurality of larger-diameter portions (28a through 28c) projecting radially outwardly and angularly spaced a predetermined angle circumferentially, and a plurality of curved and recessed smaller-diameter portions (30a through 30c) each disposed between adjacent ones of said larger-diameter portions (28a through 28c).

3. A method according to claim 2, wherein said head (26) has on an upper end thereof an annular slanted surface (36) having a tilt angle with respect to a horizontal plane, said tilt angle varying continuously circumferentially.

4. A method according to claim 3, wherein said annular slanted surface (36) has a tilt angle α at said larger-diameter portions (28a through 28c) and a tilt angle β at said smaller-diameter portions (30a through 30c), said tilt angle β being greater than said tilt angle α to cause said larger-diameter portions (28a through 28c) and said smaller-diameter portions (30a through 30c) to have different amounts of backward plastic flow depending on a material-flow resistance difference between said larger-diameter portions (28a through 28c) and said smaller-diameter portions (30a through 30c) when said intermediate

preliminary formed body (24) is extruded backwards in the next step.

5. A method according to claim 4, wherein the difference between the tilt angle α of said larger-diameter portions (28a through 28c) and the tilt angle β of said smaller-diameter portions (30a through 30c) is in the range from 3 degrees to 12 degrees.

6. A method according to claim 3, wherein said annular slanted surface (36) has a radial width which is largest at the centers of said larger-diameter portions (28a through 28c) and smallest at the centers of said smaller-diameter portions (30a through 30c).

7. A method of manufacturing an outer race member for a tripod-type constant-velocity joint having a shank and a cup which are integrally formed by cold forging, comprising the steps of:

extruding forwards a cylindrical workpiece (10) cut to a predetermined length to form a primary formed body (16) having a shank (14);

preliminarily upsetting an upper portion (18) of said workpiece (10) except said shank (14) thereof to form a secondary formed body (20);

further upsetting an upper portion (22) of said secondary formed body (20) except said shank (14) thereof to

form an intermediate preliminary formed body (24a) having an annular slanted surface (36a) which extends circumferentially along a plurality of larger-diameter portions (28a through 28c) and a plurality of smaller-diameter portions (30a through 30c) thereof and which provides a constant tilt angle in said larger-diameter portions (28a through 28c) and said smaller-diameter portions (30a through 30c) thereof;

extruding backwards said intermediate preliminary formed body (24a) to form a quaternary formed body (58) having a cup (62) with track grooves (60a through 60c) defined therein; and

ironing said cup (62) of said quaternary formed body (58).

8. A method according to claim 7, wherein said intermediate preliminary formed body (24a) has a disk-shaped head (26) which is thinner and larger in diameter than said upper portion (22) of said secondary formed body (20), said head (26) having, as viewed in plan, a plurality of larger-diameter portions (28a through 28c) projecting radially outwardly and angularly spaced a predetermined angle circumferentially, and a plurality of curved and recessed smaller-diameter portions (30a through 30c) each disposed between adjacent ones of said larger-diameter portions (28a through 28c).

9. A method according to claim 8, wherein said head (26) has on an upper end thereof a circular flat surface (33) and an annular slanted surface (36a) extending around said circular flat surface (33) and having a constant tilt angle α with respect to a horizontal plane circumferentially along said larger-diameter portions (28a through 28c) and said smaller-diameter portions (30a through 30c).

10. A method according to claim 9, wherein the area of said annular slanted surface (36a) at said larger-diameter portions (28a through 28c) is greater than the area of said annular slanted surface (36a) at said smaller-diameter portions (30a through 30c).